Hydrometrics, Inc.
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December 21, 2018

Mr. Omar Sierra-Lopez
EPA Region 8
1595 Wynkoop Street, 8P-W-GW
Denver, Colorado 80202-1129

RE: Application to add an additional Class V Underground Injection Control Well—Aquifer Recharge Wells to the Stillwater Mining Company Benbow Exploration Decline Project Stillwater County, Montana. EPA File # MT50000-10110.

Dear Mr. Sierra-Lopez:

Enclosed please find the site information request fact sheet for the above-referenced project submitted on behalf of the Stillwater Mining Company (SMC).

This application is to add an additional Class V injection control well to the SMC Benbow Exploration Decline Project (EPA File # MT50000-10110) for disposal of groundwater produced from unmineralized rock while the Benbow Exploration Decline is being driven. This injection control well is proposed to minimize potential dewatering effects of the decline. SMC is in the process of expanding its operation to the east of the existing Stillwater Mine and is driving a new decline under its Montana Metal Mine Operating Permit #00118 to facilitate exploration activities in the near term, and long term, to provide secondary access and additional ventilation for its underground workings.

The injected water will be treated by sedimentation and biological treatment for the removal of nitrogen compounds from blasting agent residues and will meet drinking water quality standards prior to reinjection. All injection will occur approximately 700 to 1,030 feet below the inferred groundwater surface. The site is remote and the nearest drinking water wells are approximately 1.6 miles to the north-northwest of the proposed injection control well. Please note that the capacity analysis used conservative assumptions and that the well may have the capacity to discharge greater flows (500+ gpm). If SMC collects additional data that shows the well can discharge at higher flow rates, SMC will notify EPA of these finding and the intent to increase the discharge rate to the well.

Should you have any questions regarding the enclosed materials, please give me a call at (406) 443-4150, Ext. 155. We appreciate your assistance in completing this permitting effort.

Sincerely,

Greg Bryce
Senior Hydrogeologist

Enclosure

Site Information Request Fact Sheet
Class V Underground Injection Control

Aquifer Recharge Wells

The Underground Injection Control (UIC) Program, created under the authority of the Safe Drinking Water Act (SDWA), is a preventative program aimed at protecting existing and future underground sources of drinking water (USDWs). Shallow wells or disposal systems that discharge fluids into the subsurface are known as Class V wells and can be authorized to inject by rule or permit. Class V wells that have the potential for ground water contamination or degradation are usually permitted. Those that do not have a potential to contribute to contamination or degradation of ground water are usually rule authorized, once inventory information has been submitted according to the requirements of 40 CFR 144.26. In addition to the inventory requirements, EPA may, under the authority of 40 CFR 144.27, require the owner or operator of any well authorized by rule to submit additional information to determine if injection activity could endanger a USDW. Rule Authorized wells do not require public notice or further monitoring of injection activities.

Artificial aquifer recharge (AR) is the enhancement of natural ground water supplies using man-made conveyances such as infiltration basins or injection wells. Aquifer storage and recovery (ASR) is a specific type of AR practiced with the purpose of both augmenting ground water resources and recovering the water in the future for various uses. While an AR well is used only to replenish the water in an aquifer, ASR wells are used to achieve two objectives: (1) storing water in the ground; and (2) recovering the stored water either using the same well or by pairing injection wells with recovery wells located on the same wellfield.

The following information is needed to evaluate the impact a shallow injection well/disposal system used for aquifer recharge will have on the local hydrogeologic system, potential for USDW contamination, and whether a **permit** for this operation, rather than a **rule authorization**, should be required.

Please provide the following information:

1. Property owner of facility including a physical and mailing address; phone and fax numbers.
Sibanye-Stillwater
Libanon Business Park
1 Hospital Street
Libanon, Westonaria, 1780, South Africa
Phone: +27 11 278 9600

2. Operator of facility including a physical and mailing address; phone and fax numbers.
Stillwater Mining Company – Stillwater Mine
2562 Nye Road
Nye, Montana 59061
Phone: 406-328-8445
Fax: 406-328-8554

3. Responsible party for the operation, maintenance, and closure of the injection system including a physical and mailing address; phone and fax numbers.
Randy Weimer, Environmental Manager
Stillwater Mining Company – Stillwater Mine
PO Box 1330
Columbus, MT 59019
Phone: 406-322-8746
Fax: 406-322-8795

4. Name of the facility.
Benbow Exploration Portal Pad Injection Well

5. Map of the site and well location.
See Figure 1.

6. Is this a proposed or existing system?
The well currently exists as a water supply well for the project. Stillwater Mining Company (SMC) is proposing to convert its designation to that of an Underground Injection Control (UIC) well and for it to be added to the current Class V UIC Project (EPA File #MT50000 – 10110).

7. Will the disposal system be handling only sanitary waste?
The system will not be handling sanitary waste.

8. Type and description of injection well.
The well (GWIC# 290312) is a 1320 foot deep, angled well (45^{o} from horizontal). The well head will be fitted with pressurization equipment adequate to inject up to 250 gpm. The well was installed by Boart Longyear of Elko, Nevada under supervision of a Montana licensed water well driller (#WWC-546). The well was completed in 2016 per Montana Regulations (MCA 36-21-subchapter 6) with 500 feet of open borehole in the target aquifer (Madison Formation). Additional details of the well are included on the well log included as Attachment A.

9. Description of the proposed injectate.
The injectate will be groundwater that is sourced from underground workings (adit water) at the Benbow Exploration Portal. During active mining the adit water contains sediment and residues from ammonia-based explosives that are used to mine ore. Nitrogen compounds (ammonia, nitrate, and nitrite) will be treated to concentrations below drinking water standards and pH may be adjusted, as needed, before re-injection. Currently the adit is not being actively mined; therefore the nitrogen compounds are below drinking water standards and the adit water may be re-injected without treatment for nitrogen. Once mining resumes, the adit water will be treated for nitrogen compounds and be treated below drinking water standards prior to discharge.

The re-injection of the adit water at this well will mitigate potential dewatering effects created during advancement and dewatering of the Benbow Exploration decline.

10. Description of the hydrogeologic conditions at the injection site, description depth and current use, if any of the receiving formations; depth and direction of flow of groundwater.

The injection well is in a remote area of the Custer-Gallatin National Forest, and is constructed through Paleozoic-aged sedimentary rocks that were faulted and tilted to near-vertical orientation against the Archean Stillwater Complex in the Beartooth Mountains. Figure 2 is a geologic map of the area. Figure

3 is a geologic cross section showing the orientation of the sedimentary units and the proposed injection well. The groundwater elevation is approximately 6,320 feet above mean sea level (AMSL) based on depth of water at the existing well.

Groundwater flow direction is assumed to be in a northwest or southeast direction along the strike of the Paleozoic rocks towards the Stillwater River or towards smaller streams that eventually discharge to the Stillwater River. The streams in the area gain groundwater in their upper reach, but lose water as they flow across the Madison Formation. During low-flow periods, all streamflow recharges the Madison aquifer, and during high-flow periods, the streams flow along their entire reach.

The Madison Formation in this area is currently being used by SMC for injection via an existing permitted injection well located approximately 1000 feet northwest and downgradient of the proposed injection well (Figure 2). Treated water from the Benbow Exploration Portal adit is also being injected in this existing well to minimize the potential dewatering effects created during adit advancement.

11. Location of existing monitoring wells (if any) and the location of any proposed monitoring wells.
No monitoring wells currently exist and none are planned because of the depth of the injection interval and recharge conditions. Injectate is not expected to recirculate to surface but migrate to depth in the Madison Formation.

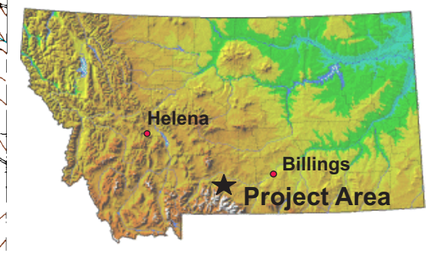
12. If injection is into an alluvial aquifer, provide locations of surface water bodies, ie. Rivers, streams and lakes within on mile of injection site (may substitute topo map).
Injection will not be into an alluvial aquifer.

13. Provide location and description of any drinking water wells within ¼ mile and how they may be impacted by the proposed injection.
The proposed injection well area is a remote location in the Custer-Gallatin National Forest. There are no drinking water wells within 1 mile that would be affected. The closest drinking water well to the site is 1.6 miles and located downgradient (to the north-northeast) of the proposed injection area.

No domestic wells are completed in the Madison Formation in this area. The online Montana Bureau of Mines and Geology Ground Water Information Center database for this area does not list any well completions below the Judith River Formation and the Eagle Sandstone which are separated stratigraphically from the Madison Formation by 17 formations.

14. Describe effect of injectate on groundwater.
Because the injectate is groundwater from bedrock that will be treated to remove sediment and nitrogen (if necessary), there are no expected incompatibilities with receiving groundwater. Injection of the adit-produced water will also minimize the potential dewatering effects caused during adit advancement.

FIGURES



NORTH

SCALE: 1 MILE

TOPOGRAPHIC MAP
CONTOUR INTERVAL
40 FEET

STILLWATER MINE

LOCATION OF PROPOSED
CLASS V INJECTION WELL

LOCATION OF BENBOW
EXPLORATION PORTAL

SIBANYE-STILLWATER MINING COMPANY BENBOW EXPLORATION PORTAL CLASS V UNDERGROUND INJECTION CONTROL WELL APPLICATION - DECEMBER 2018	**SITE MAP**	FIGURE **1**

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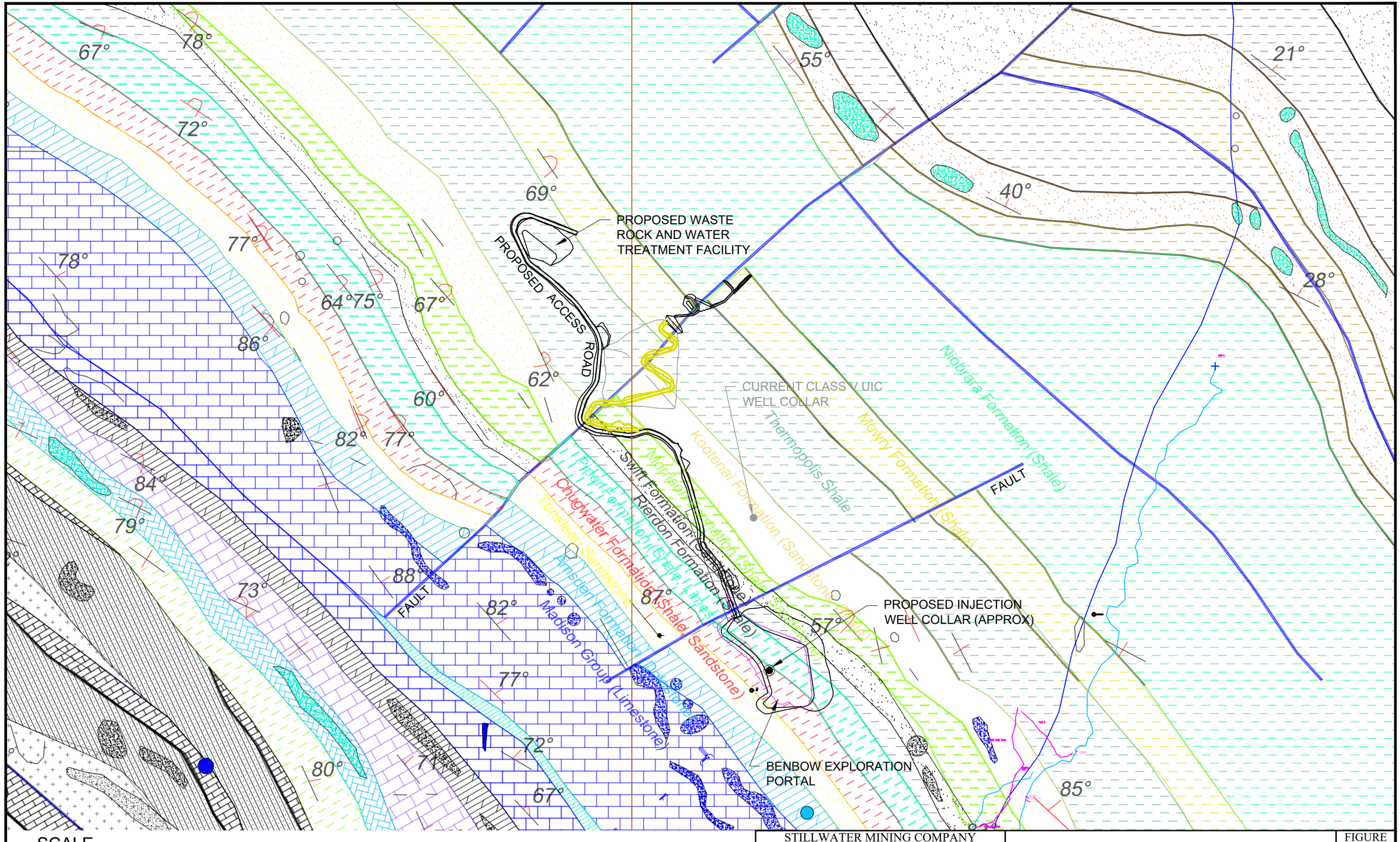

STILLWATER MINING COMPANY BENBOW EXPLORATION PORTAL UNDERGROUND INJECTION CONTROL WELL APPLICATION	**GEOLOGIC MAP**	FIGURE **2**

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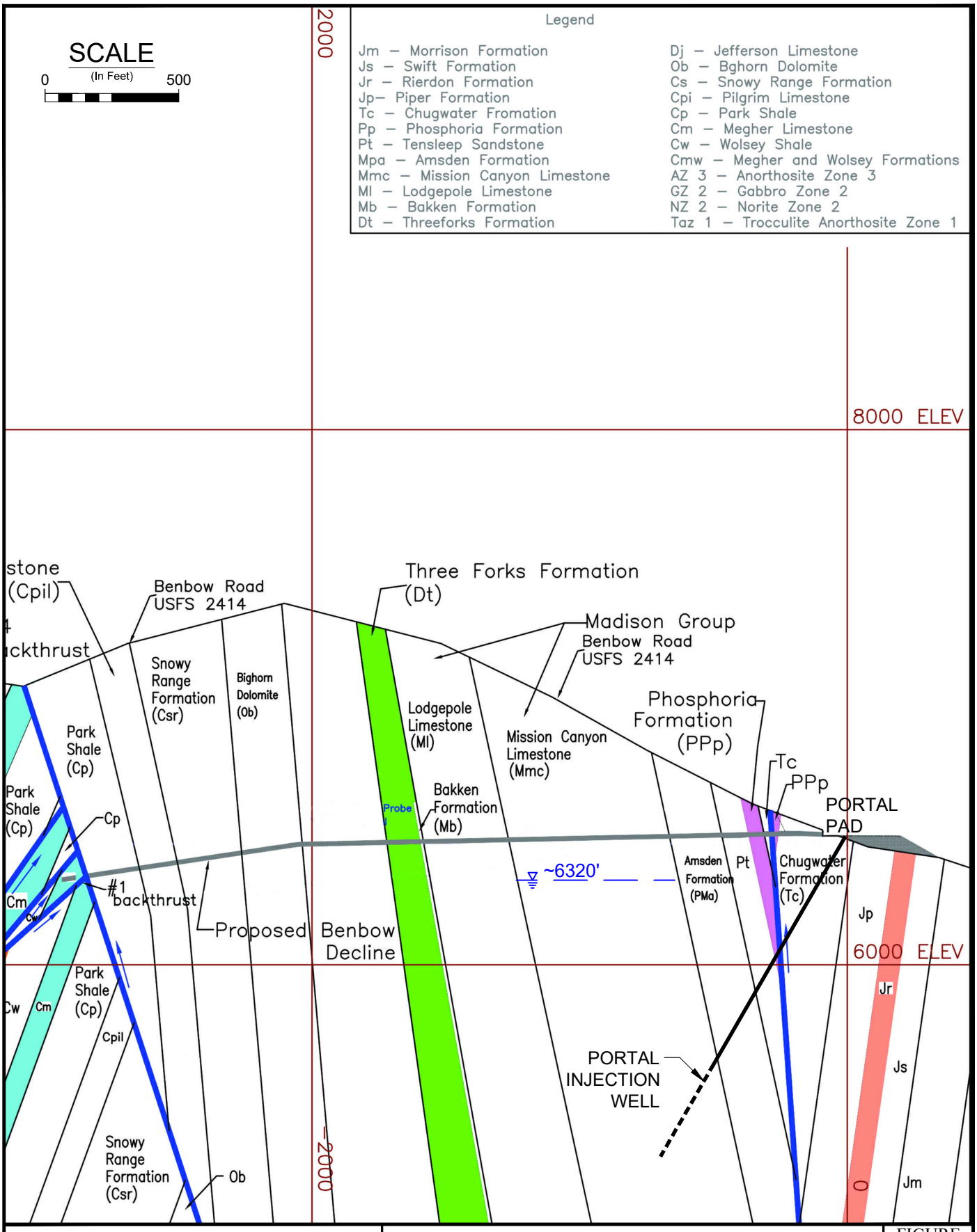

BENBOW PORTAL SUPPLY WELL
STILLWATER MINING COMPANY

GEOLOGIC SECTION SHOWING PROPOSED INJECTIONWELL

FIGURE
3

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ATTACHMENT A

WELL LOG

Hydrometrics, Inc.

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Helena, Montana

Benbow Public Water Supply Well

Hole Name: Benbow PWS

Date Started: 9/23/16 Date Finished: 11/1/16

Client: Stillwater Mining Company

Project: Benbow Blitz Project

County: Stillwater State: Montana

Property Owner: Stillwater Mining Company

Legal Description: T5S R16E Sect 20 SE/4 NE/4 SE/4

Location Description: On Benbow Portal pad 100 yards from portal

Recorded By: SMC and Hydrometrics

Drilling Company: Boart Longyear, Elko NV

Driller: Ricardo "Rico" Llamas and Glen McCally

Drilling Method: Mud Rotary and Reverse Circulation

Drilling Fluids Used: Mud, Air, Water

Purpose of Hole: Water Supply

Target Aquifer: Madison

Hole Diameter (in): 19-in to 12-1/4-in to 7-7/8-in

Total Depth Drilled (ft): 1320

WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	8-in ID, flush welded, steel	0 to 1320
Surface Casing Used?	Y	14-in surf csg; 8-in int csg -4 to 945 ft	0 to 40 surf csg
Screen/Perforations?	N		
Sand Pack?	N		
Annular Seal?	Y	Neat cement int csg inside surf csg	0 to 944
Surface Seal?	Y	Neat Cement	0 to 40
DEVELOPMENT/SAMPLING			
Well Developed?	Y	Pumped 18 hours at 275 gpm	945 to 1320
Water Samples Taken?	Y	PWS parameter list	945 to 1320
Boring Samples Taken?	Y	cuttings 10-ft intervals	0 to 1320

Northing: 413032.79 Easting: 1899391.63

Static Water Level Below MP: 331 ft along csg

Date: 10/21/2016

MP Description: top of stilling tube

MP Height Above or Below Ground (ft): 1 (vert.)

Surface Casing Height (ft): at ground surface

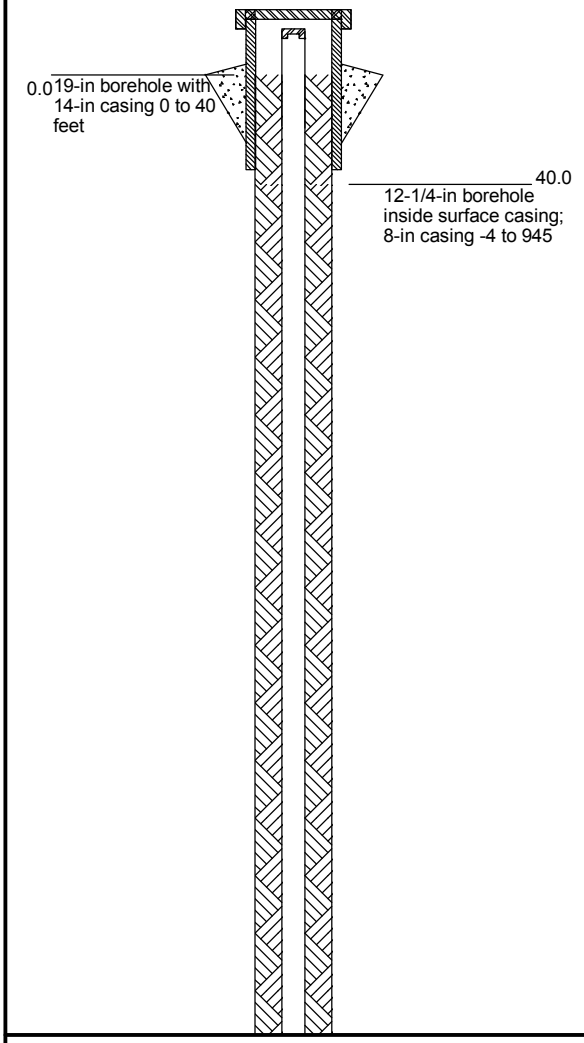
Riser Height (ft): 2.5 (vert. bottom of 8-in csg)

Ground Surface Elevation (ft): 6460.5

MP Elevation (ft): 6463

Remarks: Well is inclined -45 degrees, azimuth 239 degrees. Well location is given in NAD 83. Borehole diameter is 19-in from 0-40 feet, 14-in surface casing set to 40 feet. Borehole diameter 12-1/4-in from 0 to 1050 feet, intermediate 8-in casing set -4 to 945 feet. Borehole diameter 7-7/8-in to 1320 feet, cement basket set and grout from surface to 945 feet; open hole completion to 1320 feet. Well made 275 gpm during well development with air lifting. Pump is set at 755 feet with a 3-in galvanized STD A-53-F riser with couplers. A 48-hour aquifer test was conducted at an average rate of 218 gpm.

WELL CONSTRUCTION



SAMPLE NOTES

GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 11.0' **PORTAL PAD** [Fill]
Overburden, slightly cohesive. [Piper formation] Dry.

11.0 - 270.0' **SANDSTONE-SILTSTONE-SHALE** [Chugwater]
Well-sorted, medium dense fine-grained brown to reddish brown sandstone interbedded with greyish-brown siltstone. Black blotchy crystalization (manganese?) often present on siltstone. Assume strata overturned 70 degrees. Soft red silty clay at least 60% of return at intervals throughout unit: from 40 to 60 feet, 110 to 120 feet, 180 to 190 feet, 220-240 feet.

270.0 - 280.0' **SILTY CLAY** [Fault?]
Red silty clay about 90-95%, plastic and sticky. Gouge?
Driller notes harder drilling at 272 feet: "sandstone layer or possible fault".

280.0 - 492.0' **SANDSTONE-SILTSTONE-SHALE** [Chugwater]
Well-sorted, medium dense fine-grained brown to reddish brown sandstone interbedded with greyish-brown siltstone. Black blotchy crystalization (manganese?) often present on siltstone. Assume strata north-dipping 85 degrees.
At 310 to 340 feet up to about 80% red clay. At 360 to 380 feet cuttings contain angular calcite fragments (to 1/2-inch) (fracture fill?).

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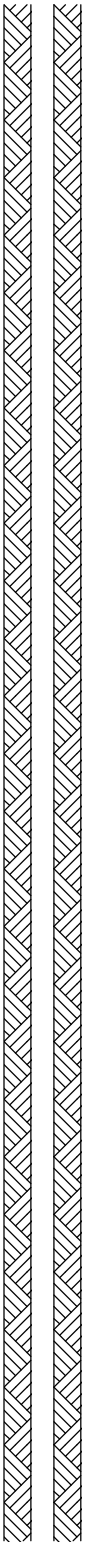
WELL CONSTRUCTION



755.0
Pump set here

SAMPLE NOTES

GRAPHICS

GEOLOGICAL DESCRIPTION

Driller notes: Hole "took a drink--fracture" at 370 feet; "rough" drilling at 381 feet--bouncing rig.
Soft red silty clay at least 60% of return at intervals throughout unit from 410 to 460 feet.
Driller notes: "Harder drilling" from 480 feet; "much harder drilling" at 492 feet "contact?"

492.0 - 590.0' **SANDSTONE AND LIMESTONE** [Phosphoria]
Well-sorted medium dense, fine-grained buff to pale grey to light yellow to pale pinkinsh grey quartz sandstone interbedded with compact, fine-grained light grey to pale olive limestone. Assume strata are north dipping. Driller noted possible fracture at 525 feet. Cuttings contain red silty clay and minor dark brown quartz sandstone fragments at 510 to 530 feet.
Driller noted high torque at 530 feet.
At 560 to 590 feet fault breccia? Pale grey silt and sand containing angular fragments of light grey fine-grained medium dense limestone and light yellow fine-grained sandstone with trace pyrite.

590.0 - 730.0' **SANDSTONE** [Tensleep]
Well-sorted, medium dense, fine to medium-grained well-rounded white to buff, peach, reddish grey to yellow quartz sandstone with thin aqua siltstone and pinkish-grey limestone interbeds; some sandstone fragments display thin fractures (about 1 mm) filled with calcite. Assume strata are north-dipping.
At 590 to 610 feet, red silty clay, about 90 to 95% plastic and sticky. Fault gouge?
At 630 to 640 feet, return contains about 65% brownish-red silty clay with fragments of white or buff to reddish grey sandstone and dark reddish-brown sandstone.
At 640 to 650 feet, return contains fragments of yellow medium-dense, well sorted and rounded medium-grained sandstone and pale aqua siltstone.
At 650 to 700 feet, some calcite crystals with euhedral faces-vug fill/ recrystallized?
Driller noted "fracture" at 683 feet.

730.0 - 905.0' **SILTSTONE-SANDSTONE-DOLOSTONE** [Amsden]
Compact red siltstone interbedded with medium-dense well-sorted fine to medium grained buff to tan, dark purplish grey and chocolate quartz sandstone. Assume strata are north-dipping.
At 700 to 710 feet, greater than 80% red silty clay with sandstone fragments. White silt and fine sand at 720 to 730 feet changing to red silty clay with sandstone fragments from 730 to 770 feet.
At 850 to 860 feet, olive brown limestone; fragments form thin shards; highly effervescent.
Driller noted "fracture" at 876 feet.

Continued Next Page

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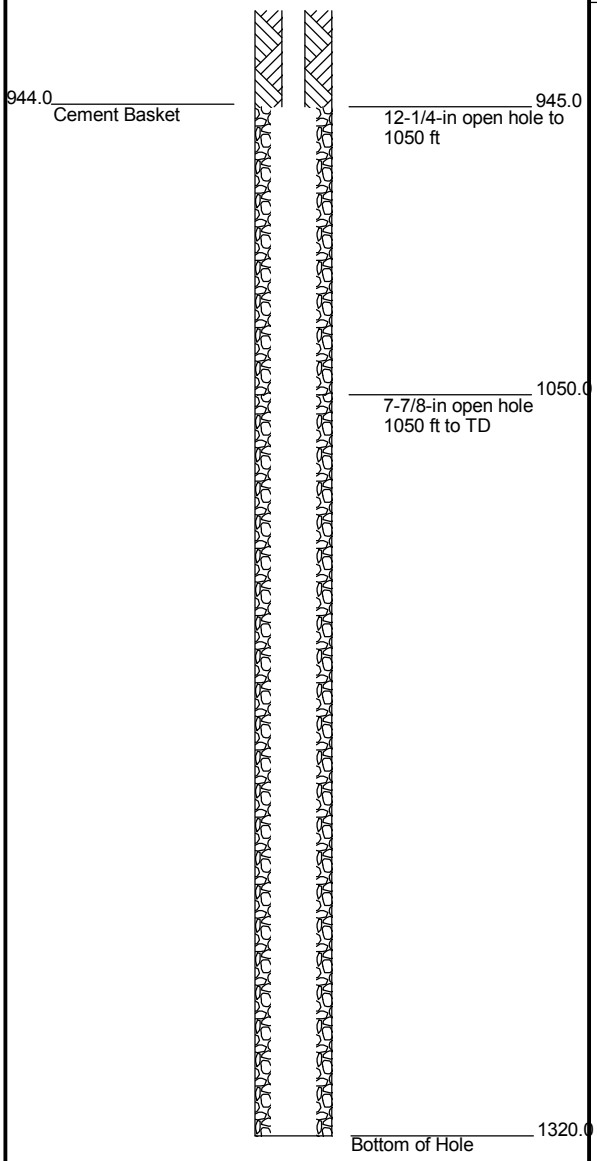
Helena, Montana

Benbow Public Water Supply Well

Hole Name: Benbow PWS

Date Started: 9/23/16 Date Finished: 11/1/16

WELL CONSTRUCTION



SAMPLE NOTES

GRAPHICS

GEOLOGICAL DESCRIPTION

905.0 - 1320.0' **LIMESTONE** [Madison]
Compact, generally fine-grained white to light grey, buff, pale orange, olive brown and medium grey limestone. Assume strata are north dipping. Driller noted clay at 1000 feet. Coarse-grained/oolitic from 1140 to 1220 feet. Driller noted fracture at 1139 feet. Occasional dark brown to black metallic mineralization; possibly manganese?

At 1180 to 1200 feet, making 250 gpm.
At 1200 feet, making 250 gpm.
At 1320 feet, making 275 gpm.